

# A NEW LARVAL MITE (ACARINA: TROMBIDIOIDEA) ECTOPARASITIC ON AN AUSTRALIAN CENTIPEDE, AND THE TROMBIDIIDAE RECLASSIFIED

by R. V. SOUTHCOTT\*

## Summary

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*Wondeclia centipedae* gen. nov., sp. nov. is described, as an ectoparasite on the centipede *Rhysida nuda* (Newport) (family Scolopendridae) from north Queensland. It is the first larval trombidioid mite known as a centipede ectoparasite. The mite lacks eyes, and is unusual in the posterior displacement of the anteromedian scutal setae and their wide separation, the anterior displacement of the posterolateral scutal setae, the thickening of the anteromedian, anterolateral and sensillary scutal setae, and the excavation of the anterior scutum's anterior border.

A new subfamily, Wondeclinae, is erected for the genus, which is included with the Trombidiinae and Allothrombiinae in a restricted family Trombidiidae.

Metric characters for shield and leg characters customarily used in describing and specifying larval trombidioid mites are analysed by correlation methods. A moderate degree of positive correlation, above twice that of random expectation, is present throughout the sets of comparisons of the groups of variates utilized. There is no excess of negative correlations.

KEY WORDS: Taxonomy, *Wondeclia*, Wondeclinae, centipede, Queensland, Acarina, Trombidiidae, Trombidoidea, correlation.

## Introduction

Centipedes and millipedes are well known hosts for commensal or phoretic mites of a number of families (e.g. Berlese 1882, 1910a, b; Vitzthum 1941; Evans 1955; Domrow 1956; Rack 1979). André (1943) considered that some of these relationships verged on parasitism, a suggestion confirmed by Shiba's (1976) record of a larval trombidioid mite, *Milliotrombidium milliopodum* Shiba, ectoparasitic on millipedes in Malaya. However, larval trombidioid mites seem not to have been found on centipedes (see e.g. Oudemans 1912; Thor & Willmann 1947; Cloudsley-Thompson 1968).

A new genus and species of larval trombidioid mite ectoparasitic upon a north Queensland centipede is described below and its taxonomic position within the superfamily Trombidoidea discussed. It is placed in a new subfamily of a restricted family Trombidiidae, and some comments are made on its biology.

A key for the separation of the subfamilies of the Trombidiidae is presented.

Seta terminology follows Southcott (1961a, b, 1963, 1986a, 1987).

## TAXONOMIC DECISIONS AND ACCOUNTS

Superfamily Trombidoidea Leach

Trombidoidea Leach, 1815 (restricted)

Trombidoidea Leach; Southcott, 1987.

Definition: As in Southcott (1987).

Family Trombidiidae Leach s. str.

Trombidoidea Leach, 1815 (restricted)

Trombidiidae Southcott 1986c.

Definition: As in Southcott (1986c).

Type genus *Trombidium* Fabricius, 1775.

## Key to larvae of subfamilies of Trombidiinae

1. Anterior dorsal scutum more or less rounded anteriorly, without anteromedian excavation. AM setae of anterior dorsal scutum unmodified, arising towards anterior pole of scutum and in front of all other setae of scutum. Sensillary setae slender, tapering, not clavate. Eyes 2 + 2 ..... 2  
Anterior dorsal scutum with anteromedian excavation. AM setae displaced posteriorly nearly to mid-level of shield, short and clavate with long setules. AL setae the anteriormost setae of scutum, arising near AL angles. Sensillary setae clavate with strong setules, arising behind level of PL setae. Eyes absent .....  
..... Wondeclinae subfam. nov.
2. Urstigma oval\* ..... Trombidiinae  
Urstigma circular\* ..... Allothrombiinae

Remarks: With the discovery and formal description of *Wondeclia centipedae* and its placement in the subfamily Wondeclinae, the subfamilies Trombidiinae and Allothrombiinae Thor, 1935 (see the discussion in Southcott 1986c), together with the Wondeclinae, should be placed in a restricted family Trombidiidae, as redefined

\*This distinction is tentative. See the discussion in Southcott (1986c).

\*2 Taylors Road, Mitcham, S. Aust. 5062.

(Southcott 1986c). That definition applies to all known adults and deutonymphs of the Trombidinae and Allothrombinae, but may need modification for the Wondeclinae, when the post-larval forms become known.

**Subfamily Wondeclinae subfam. nov.**

**Definition of larvae:** Eyes absent. Anterior dorsal scutum without nasus; with anteromedian excavation; AL scutal setae at anterolateral angle of scutum; AM setae well separated, displaced posteriorly nearly to level of middle of scutum; PL setae displaced anteriorly to level of middle of scutum. Sensillary setae widely separated, clavate, setulose. All coxal setae setulose. Tarsal claws 3, 3, 3.

Type genus *Wondeclia* gen. nov.

**Genus *Wondeclia* gen. nov.**

**Definition of larva:** Wondeclinae. Anterior prodorsal shield approximately square, posterior prodorsal scutum a transverse oblong. Scutal sensilla at about level of junction of third and fourth quarters of scutum. Posterior dorsal scutum with four normal, setulose setae. Tarsal claws falciform, simple. Gnathosoma with compact chela-bases. Cheliceral blade with 2-4 barbed teeth. Galeala robust, sinuous, expanded near its base, unbranched. Palpal tibial claw bifid. Two large, setulose, posterior hypostomalae (tritornistral setae).

Type species *Wondeclia centipedae* sp. nov.

***Wondeclia centipedae* sp. nov.**

FIGS 1-6

**Description of larva** (from Holotype SAM N19879, supplemented by other specimens). Yellow in life. Idiosoma ovoid (Fig. 1), somewhat flattened dorso-ventrally; length (mounted) 710  $\mu$ m, by 570  $\mu$ m wide.

Anterior dorsal scutum widening a little posteriorad, with truncate anterolateral angles and rounded posterolateral angles (Fig. 3A); all sides somewhat concave, with anterior excavation the deepest, but owing to anterior edge being bent somewhat forward and down, apparent depth of anterior excavation may appear slight. Anteromedian scutal setae short, asymmetrical, with about four long, strong, pointed setules; these setae nearer to edges of scutum than to centre. Anterolateral scutal setae tapering, pointed, with long, strong, pointed setules. Posterolateral scutal setae similar, but more slender, near middle of lateral border, causing a slight convexity there. Sensillary setae most posterior setae of shield, long, with long, strong, pointed setules, orifices facing posterolaterally (Fig. 3A). Ridge of chitin runs from

AL angle of shield to the annulus of AM seta. Shield porose.

Posterior dorsal scutum: porose; anterior border with a slight anterior projection, lateral borders convex, projecting anterolaterally, posterior border straight or sinuous; medial two setae anterior to posterior pair, and nearer to middle of scutum, posterior two setae nearer to lateral borders. All setae with outstanding setules.

For metric details of scuta and legs, see Table 1. (See Fig. 4 for interpretation of the setae of the scuta, and the conventions of seta and other codings.)

Dorsal idiosomal setae are pointed, with strong, barbed setules, and arranged in rows of 2 (between level of the two prodorsal shields), 4, 6, 10, 6, 2, 2; total 32 (Fig. 1). Ventral surface of idiosoma lacks setae between coxae I and II; a pair of setae between coxae III, slender, pointed, barbed, 37  $\mu$ m long. Behind level of coxae III about 27 setae in irregular transverse rows, similar to preceding, becoming longer posteriorad, 20-42  $\mu$ m long.

Legs short, moderately robust; lengths (including coxae and claws) I 260  $\mu$ m, II 230  $\mu$ m, III 240  $\mu$ m.

All coxalae long, pointed, strongly setulose. Lateral coxala I 46  $\mu$ m long, medial coxala I 37  $\mu$ m, anterolateral coxala II 45  $\mu$ m, posterolateral coxala II 39  $\mu$ m, coxala III 27  $\mu$ m. Urstigma large, prominent, approximately circular, external diameters 12  $\mu$ m by 10  $\mu$ m. Leg scobalae similar to coxalae; trochanteral scobalar formula 1, 1, 1, femoral 5-6, 4, 4, genual 4, 2, 2, tibial 6, 5, 5. Pedal supracoxalae absent.

Specialized setae of legs (except tarsi) as follows: SoGel.20pd (16  $\mu$ m), SoGel.40d (17  $\mu$ m), VsGel.70d (4  $\mu$ m), SoTil.27pd (13  $\mu$ m), VsTil.59d (4  $\mu$ m), SoTil.69pd (12  $\mu$ m), SoGel.24pd (29  $\mu$ m), SoTil.31pd (12  $\mu$ m), SoTil.67pd (10  $\mu$ m), SoGel.46d (18  $\mu$ m) (Figs 5-6).

Tarsus I and II each with a large central dorsal solenoidale. Specialized setae codings SoTal.44d (14  $\mu$ m), FaTal.49d (3  $\mu$ m), SoTal.44d (18  $\mu$ m), SoFal.33pd (4  $\mu$ m). Pretarsal formula 1, 0, 0. Tarsal claws normal, robust, subequal.

Gnathosoma robust, compact, each chela base from above irregularly ovoid, length 57  $\mu$ m from tips of extruded chela digits to posterior pole of bases; combined chela bases 55  $\mu$ m wide. Chela digits (blades) sharp-pointed, with 2-4 (usually 3) retrorse dorsolateral teeth, along edge. Galeala 15  $\mu$ m long, tips pointing laterally. Posterior hypostomalae 26  $\mu$ m long, somewhat bulbous towards base of shaft, shaft with several long, strong setules. Palpal setal formula 1, 0, 3, 6. Palpal femorala dorsul, spiniform, 5  $\mu$ m long. Palpal tibialae and tarsalae as figured. Palpal tibial claw with tines robust, subequal but the dorsal the longer,

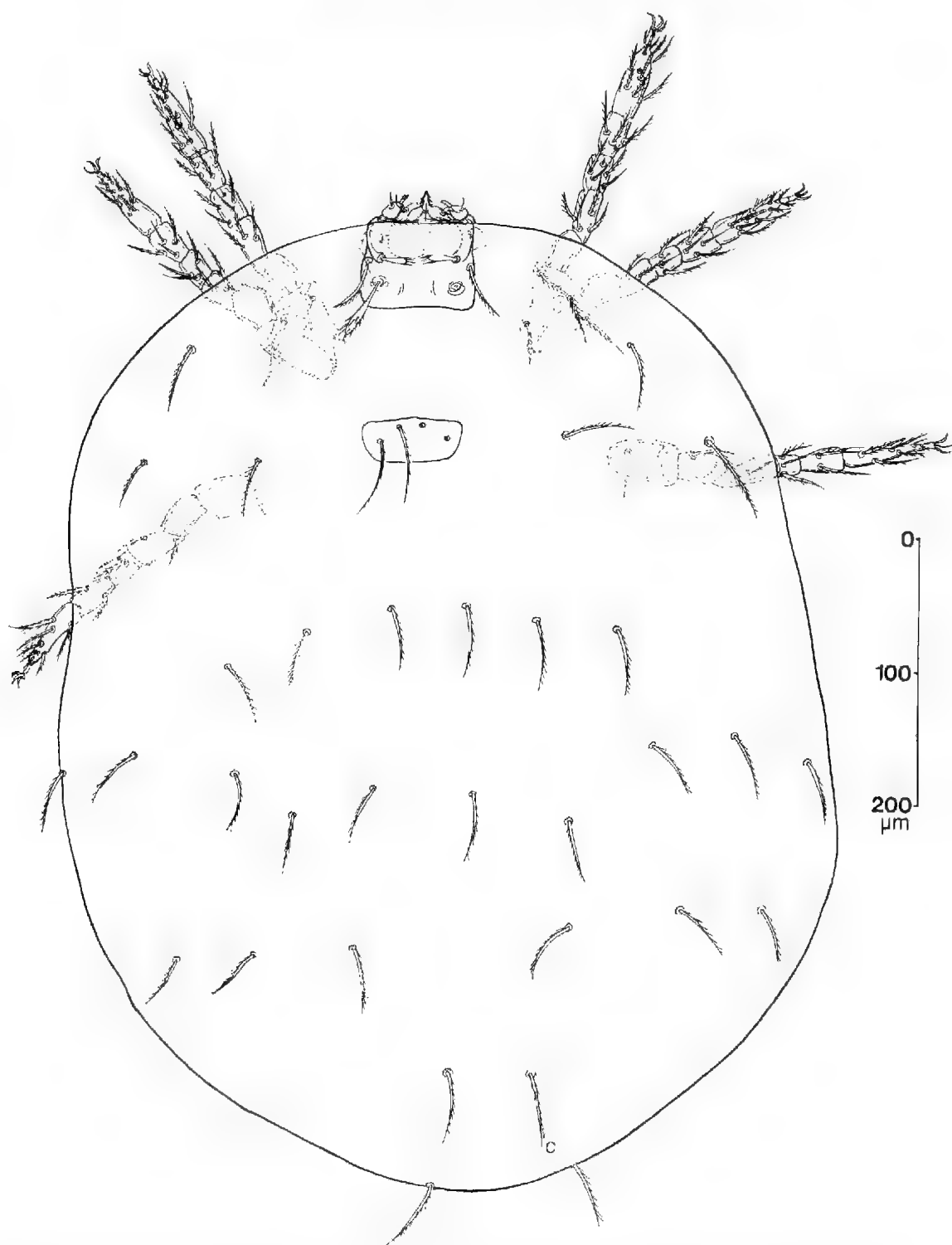


Fig. 1. *Wondeclia centipedae* gen. nov., sp. nov. Larva, holotype. Dorsal view, entire, shown partly in transparency (scutal sensillary seta from another specimen). To scale shown; seta "c" is figured in Fig. 3C.

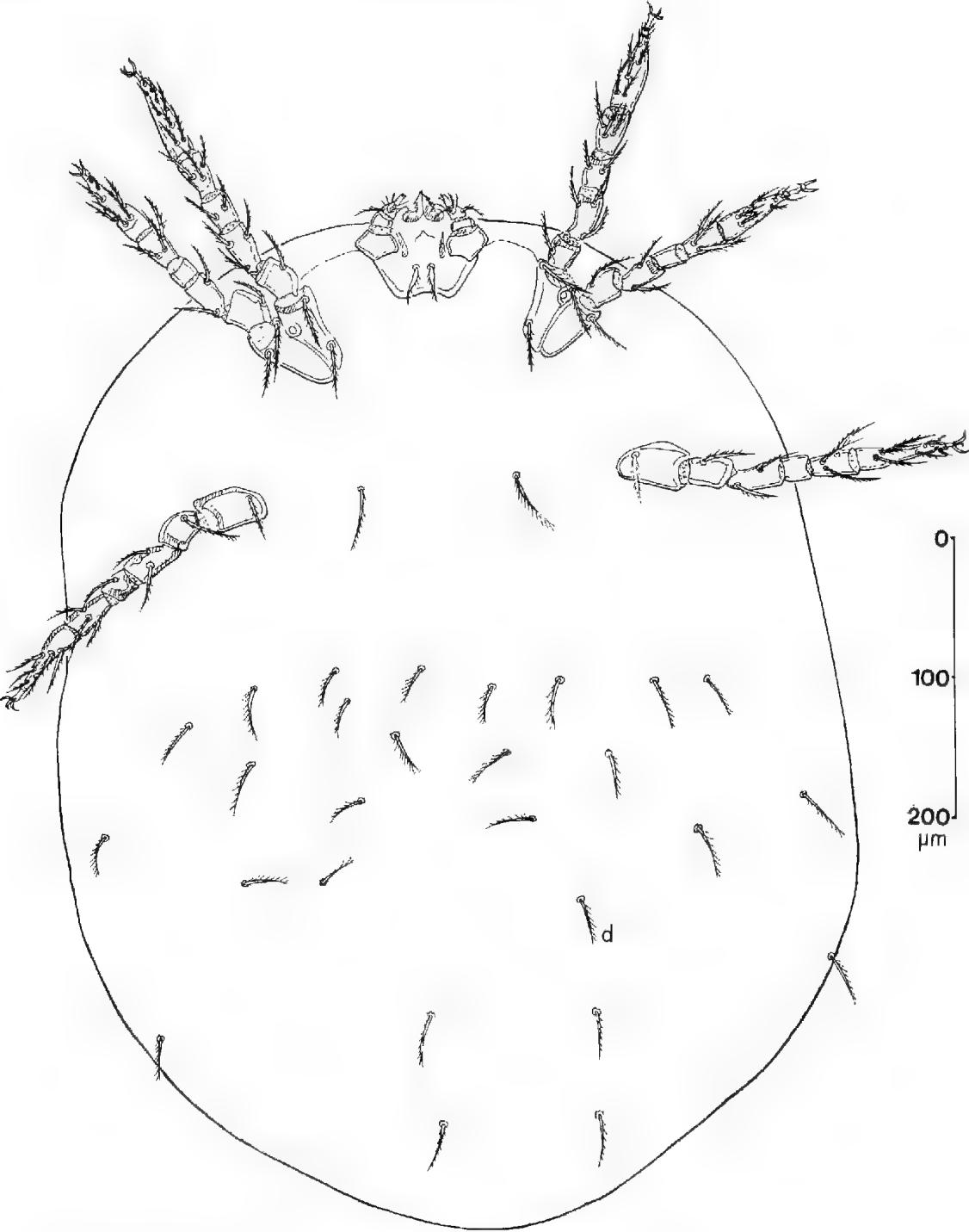


Fig. 2. *Wondeclia centipedae* gen nov., sp. nov. Larva, holotype. Ventral view, entire, to scale shown; seta "d" is shown in Fig. 3D.

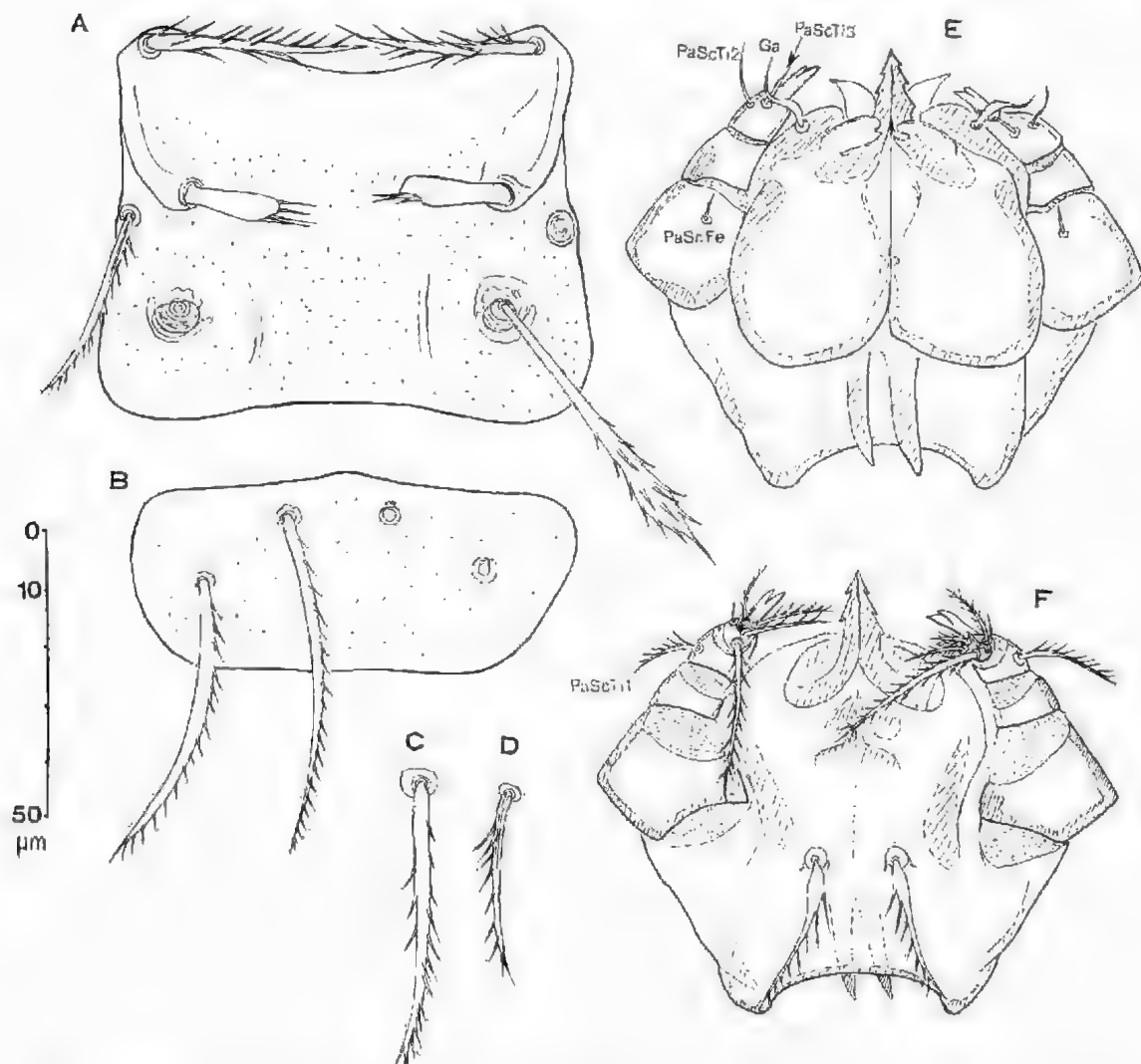


Fig. 3. *Wondeclia centipedae* gen. nov., sp. nov. Larva, holotype. A Anterior dorsal scutum (sensillary seta is from another specimen), B Posterior dorsal scutum. C Dorsal idiosomal seta ("c" in Fig. 1). D Ventral idiosomal seta ("d" in Fig. 2). E Gnathosoma, dorsal aspect. F Gnathosoma, ventral aspect. (All to scale shown.)

blunt-pointed; with a slight split. Palpal supracoxalae absent.

Metric data are provided in Table 1.

**Material examined:** Queensland: Wondecla, in eucalypt forest, 2.iii.1944, R. V. Southcott; 30 specimens, (South Australian Museum): SAM N19879 (Holotype, also with label ACB613A (RVS)); N198710-198738 (paratypes); ectoparasitic upon centipede SAM A391, *Rhysida nuda* (Newport) (kindly identified by Dr L. E. Köch, Western Australian Museum).

#### Correlations between shield and leg variates

In continuation of previous studies (Southcott 1966, 1986a, b, c) into the degree of correlation between

shield and leg variates in prostigmatic mites; the data of 15 specimens of *W. centipedae* were examined by correlation analysis. The results are shown in Fig. 7.

Among a tabulation of  $49 \times 49$  variates we may expect to find a number of significant correlations by chance alone; half of these should be positive and half negative. In Table 2 are shown the findings for the comparisons, at three levels of probability.

Fig. 7 and Table 2 show that there is a significant excess of positive correlations, and a deficit of negative correlations, from random expectations. There are no negative correlations at the 0.001 level of probability, and only two at the 0.01 level of



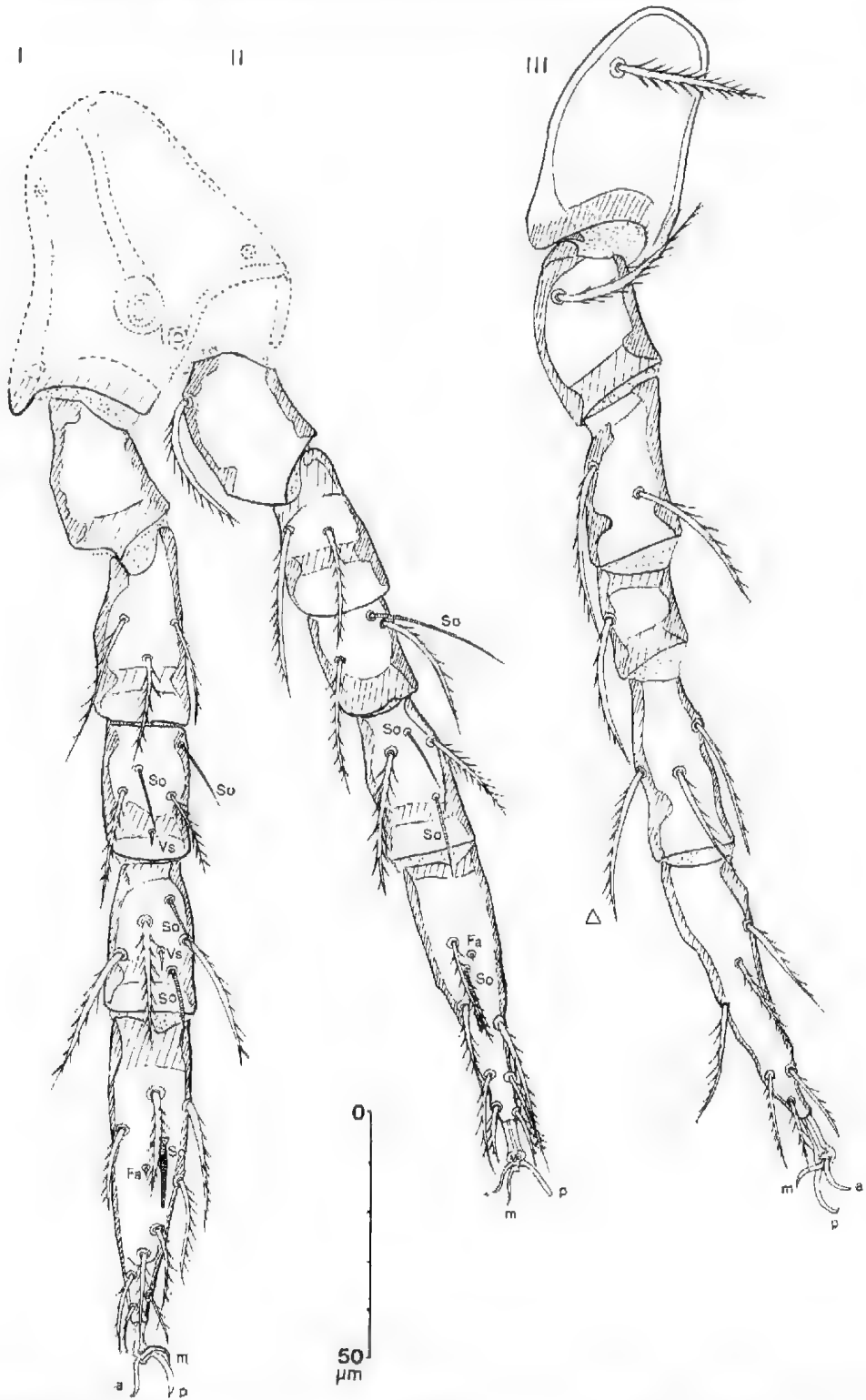


Fig. 5 *Wondeclia centipedae* gen. nov., sp. nov. Larva, holotype. Legs I, II and III, to scale shown, to standard notation. Dorsal aspect of legs I and II, and anterodorsal aspect of leg III.

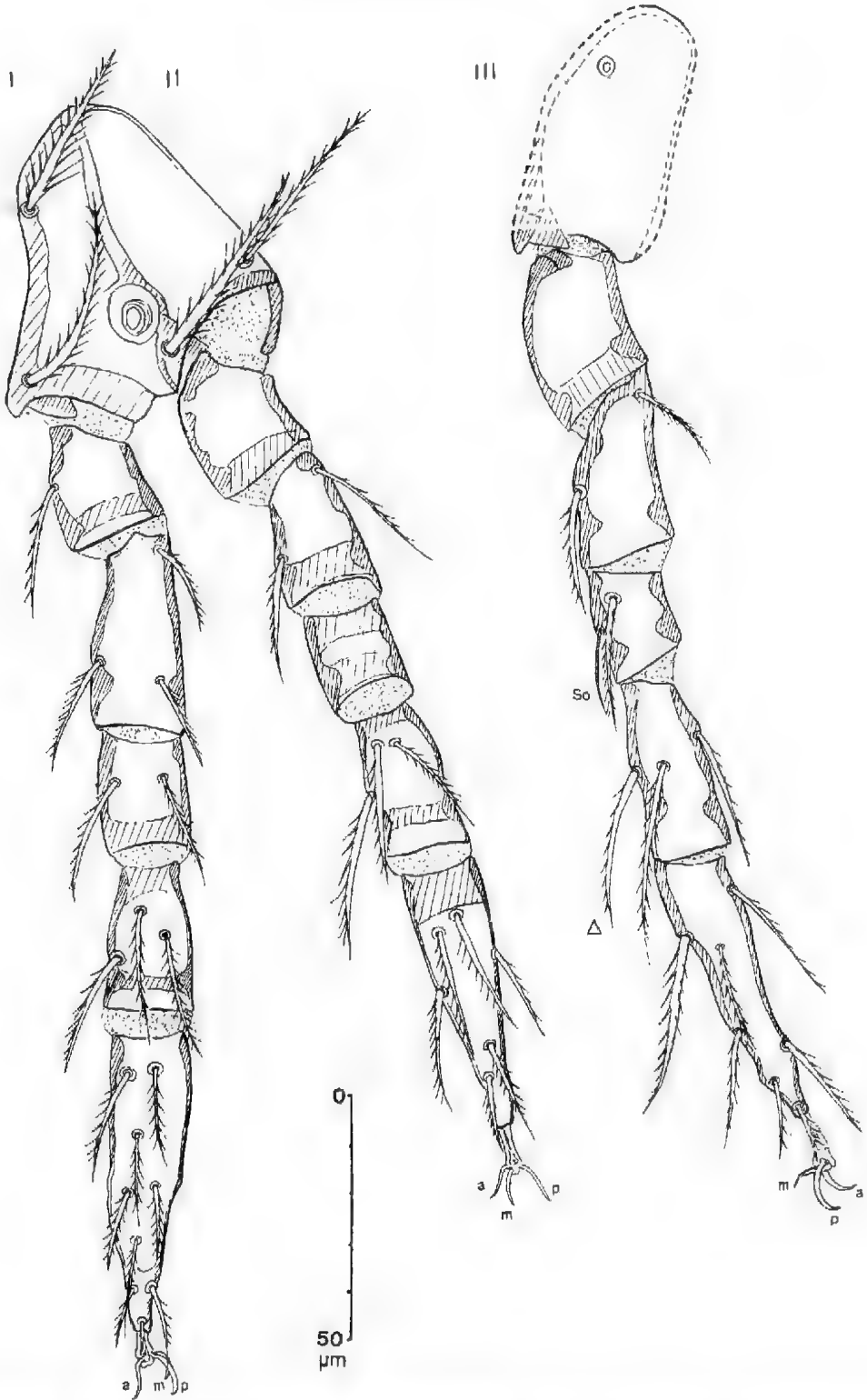


Fig. 6 *Wondeclia centipedae* gen. nov., sp. nov. Larva, holotype. Legs I, II and III, to scale shown, to standard notation. Ventral aspect of legs I and II, and posteroventral aspect of leg III.



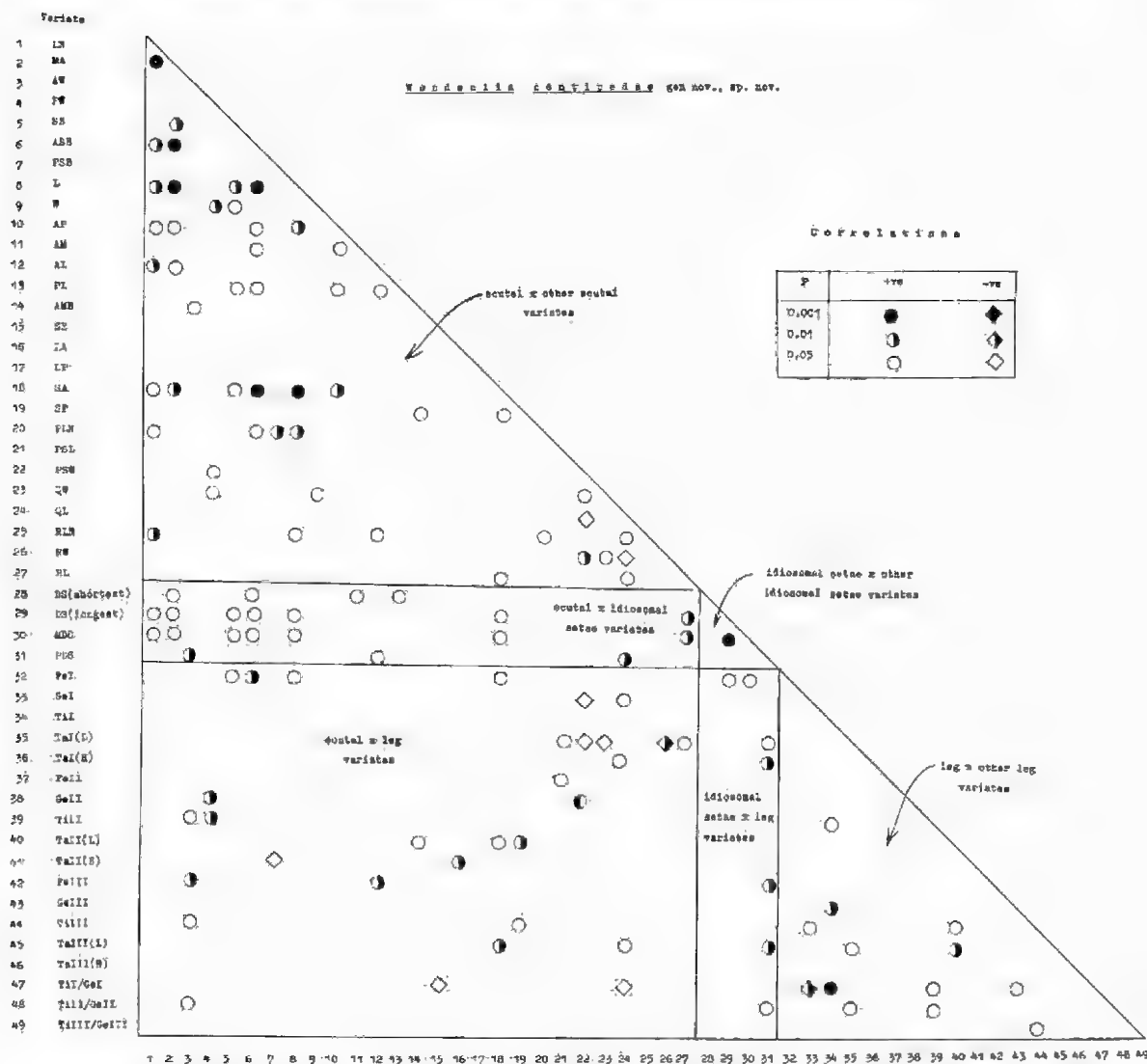


Fig. 7. Correlation matrix of data of *Wondeclia centipedae* gen. nov., sp. nov., for 49 × 49 variates (see text).

be made. The dead centipede and its mites were placed in a tube. Two days later some of the mites were still alive on the host. No particular sites of attachment on the centipede were observed.

The mouthparts of the mites are well-developed for piercing, in fact the cheliceral digits are longer, more pointed, and with more developed barbs than in most trombidoid larvae. Presumably the intersegmental membranes of the centipede would offer least resistance to puncture.

The absence of eyes in a larval trombidoid is unusual, and is consistent with a hypothesis that this larva is well-adapted to a life of parasitism upon a nocturnal and soil- and litter-inhabiting host. The

flattened idiosoma of the mites may be compared, for example, with that of the trombiculid mite genus *Babiangia*, an ectoparasite upon smooth-skinned skinks (Southcott 1954). Possibly such flattening is an adaptation to a mode of life in a restricted space on a flexible, soil-inhabiting host, and might reduce the risk of being wiped off as the centipede moves through soil and litter.

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TABLE 3. Classification of positive correlations between variates in larvae of *Wondelia* centipedae, for observed and expected values.

Variate groups compared	Number of comparisons available	Observed numbers			Expected numbers
		0.001	0.01	P 0.05	
1. Shield $\times$ other shield variates	351	6	19	48	8.78
2. Shield $\times$ idiosomal setae variates	108	0	4	21	2.7
3. Idiosomal setae $\times$ other idiosomal setae variates	6	1	1	1	0.15
4. Shield $\times$ leg. variates	486	0	9	24	12.15
5. Idiosomal setae $\times$ leg. variates	72	0	3	7	1.8
6. Leg $\times$ other leg. variates	153	1	2	11	3.83
Totals	1176	8	38	114	29.4

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